TRAINING OUTLINE

for

DATAMASTER

INFRARED BREATH TEST INSTRUMENT

INSTRUCTOR REFRESHER

Approved 7/26/95, 1995

By _____
Barry K. Logan, Ph.D
Washington State Toxicologist

Prepared At

The Washington State Patrol Breath Test Section

DATAMASTER INSTRUCTOR REFRESHER TRAINING

July 21, 1995 Prepared by the Breath Test Section

To be presented in 8 50 minute periods.

INSTRUCTIONAL OBJECTIVES

1. The student will have a thorough understanding of the Datamaster program.

2. The student will understand the basic principles of infrared spectroscopy as it relates to the Datamaster.

3. The student will be familiar with the data entry questions and their meaning.

4. The student will be familiar with the steps of instrument operation and their purpose.

5. The student will know how to compute the +/-10% between two breath tests.

6. The student will be able to explain the breath sampling parameters used in the instrument.

7. The student will know the importance and meaning of the external standard.

8. The student will know the importance of the simulator temperature and how to properly read, report, and instruct in this regard.

9. The student will be knowledgeable of the legal aspects of breath testing to include: Statutes, WACs, Case Law.

10. The student will be aware of common troubleshooting problems as they relate to operation.

11. The student will know how to conduct a Basic 16 hour class.

12. The student will know how to conduct a 4 hour Refresher class.

13. The student will be thoroughly familiar with the exams given in the Operator's classes and be able to discuss them with students.

14. The student will be able to teach the entire outlines used in the Basic and Refresher Operator Classes.

15. The student will pass an examination with 80% and be qualified as an Instructor.

I. INTRODUCTION

A. This unit of instruction is designed to refresh and maintain your competency as operator Instructors on the Datamaster breath test instrument.

B. Class Handouts.

1. Basic Course Outline for Datamaster instrument.

2. Refresher Course Outline for Datamaster instrument.

3. Operator Basic and Refresher Exams.

4. Data Entry questions, set key operatons, F1 key functions, key board password.

II. CHEMICAL PRINCIPLES

A. The Datamaster is a forensic breath testing device which uses infrared spectroscopy to measure breath alcohol.

B. Infrared spectroscopy is an analytical technique used to quantify the interaction between infrared light and organic molecules.

C. Ethanol absorbs the infrared energy.

D. Absorbance is directly proportional to concentration (Beer/Lambert Law).

III. NOMENCLATURE

A. Heated Breath Tube.

1. Heated so it is warm/hot to the touch. Apx. 50°C but not a required temp.

2. Heated to prevent condensation from forming in the breath tube.

3. Loss of heat has no apparent effect on breath test results but could cause "Ambient Fail" and thereby abort the breath test.

B. Five-Way Valve.

1. Directs the vapor flow path for the simulator and breath samples into the sample chamber at the appropriate times.

C. Sample Chamber.

1. The IR path is 1.1 meters long through the use of mirrors and is said to be "folded".

2. Is heated to 48°C - 52°C, inclusive. If temperature is outside this range the instrument will display a message.

3. Sample chamber is 50 ml's. As air is blown through the chamber and the excess air is vented through a one-way valve, not a closed system. When there is no more air flow the air in the chamber becomes static and thats when the last three quarter second measurements are taken and averaged for that samples reading.

4. Infrared light source located at one end with the detector located at the other.

D. Filters.

1. Alcohol and interference filters narrow down the infrared energy to two wavelengths: 3.37 microns and 3.44 microns.

2. Quartz standard (internal standard) ensures that the instrument is working properly by checking the value received with a value which is stored into memory during calibration.

E. Detector.

1. Reads the amount of IR energy which is transmitted.

IV. STEPS OF OPERATION

A. Important to review and demonstrate to students in Basic and Refresher Classes.

B. Emphasize the importance of 15 minute observation for mouth alcohol.

C. After Operator has completed his 15 minute observation period and has started the testing procedure, including the data entry of the 15 questions the instrument will display "Purging".

D. Instrument displays "Ambient Zeroing".

E. "Blank Test".

F. "Internal Standard" check.

G. Instrument asks for subject sample. Sample is provided.

1. An end-expiratory breath is ensured by sample acceptance parameters.

2. If mouth alcohol is present the BrAC curve will peak sharply and then decline to actual deep lung BrAC. This produces a negative slope which the instrument measures and displays "Invalid Sample"

3. To incomplete a test allow the instrument to time out. On older models hit 'N' at the question 'Subject Refuse Y/N?'.

H. In '94 series results are no longer displayed on the screen, wait for the document. Results in terms of grams of alcohol per 210 liters of breath, sent to the printer memory and stored in the memory.

I. "Analyzing" after each introduction of alcohol.

J. Instrument purges sample chamber.

K. Instrument runs external standard.

1. External standard test is independent check on operation and calibration of instrument..

2. Temperature must be **34°C +/- .2°C** . Emphasize that the operator MUST visually check the thermometer at the time they answer the question. The scale on the thermometer must be thoroughly understood and the units clearly reported.

3. Its value must fall between .090 and .110 g/210L inclusive of the two end values.

NOTE: The simulator uses a mercury thermometer to measure the temperature. If the thermometer is broken there is a risk of mercury poisoning. A WSP Technician must be notified immediately if this happens. Point out to operators the sections of code book: General Information and Emergency Information.

4. The solutions are made by the State Toxicology Laboratory, are assigned a batch number and have affidavits sent with them.

5. Instrument pumps air through simulator and samples headspace (vapor above solution). A known air-water partition ratio exists in the headspace (Henry's Law). Once the sample enters the sample chamber it's alcohol content is determined in exactly the same way as the subject sample.

6. The 94 series instruments ensure the external standard is within range or the test aborts.

L. Instrument purges the sample chamber and repeats subject testing procedure. After final Blank Test the evidence document is printed and expelled from the printer. 94 series figure the 10% of the average rule automatically. If out of range the document will not print out, the test is aborted.

V. LEGAL ASPECTS

A. Review current DUI law.

B. Review current Implied Consent law.

C. Explain any new relevant court decisions.

VI. SUPERVISORY CONTROL PANEL USE

A. A password protected built-in keyboard on 94 series models, the top row except 'RUN'.

B. Nomenclature.

1. SET - used to view the options under which a Datamaster is operating. When the option has been reached press ADV key to change the option.

2. F1 - allows you access to nine functions and to initiate them press F2.

3. SUP - initiates a supervisory test. This test allows you to check the value of a simulator solution or purge the sample chamber depending on what is connected to the simulator ports.

4. TST - allows you to run a diagnostic check, which tests the mechanical and computer function, and the calibration.

5. MTR - allows you to check the detector voltage.

6. NV - allows you to by-pass sampling parameters.

7. ABT - allows you to abort any test currently being performed by the Datamaster. **Do Not Press This Button During 'Ambient Zeroing'.**

8. CLR - used to clear the display and return it to a flashing READY - PUSH RUN.

9. CPY - used to retrieve a copy of the last test performed, as long as none of the following have occurred: RUN button pushed, power outage, ABT pushed, TST pushed.

10. CAL - on older instruments, used to calibrate the instrument. **Do Not Press this Button.**

C. Options setting for instructing classes.

1. Ensure that the time and date are correct when the instruments are powered on.

2. Press F1 so that the display reads **RESET OPTIONS** then push F2 to reset the options for a breath test.

3. Use the **SET** and **ADV** keys to set the data collection to **OFF.**

4. If **RAM ERROR AT _ _ _ _** is displayed, press **CLR.**

VII. TROUBLESHOOTING

A. "System Won't Zero", "Ambient Fail", "Detector Overflow"

1. If this appears on the display restart test.

2. If message occurs again purge chamber by going to purge in F1.

3. Purge until the display reads .000.

4. To avoid this problem purge the instruments between classes and blow the moisture out of the simulator hosing.

5. If there is a recurring problem contact a Technician.

B. Printer problems and ticket problems.

1. If the ticket does not feed out properly check to see if the operator has inserted the ticket properly. Push **CPY** to get a copy of the last test.

2. If the instrument does not ask for the ticket let the test time out and then insert the ticket before pushing the **RUN** button. This will occur when the operator pulls the document out of the printer or there is a power failure.

3. No printing on ticket - ribbon may be worn out or has come off spools. Call a Technician.

4. Ticket does not feed into printer. Check to see if the ticket has been pushed underneath the printer or is too wide. Insert ticket correctly and push **CPY.**

C. "Invalid Sample".

1. Operator may be blowing too hard. Ask operator to exhale normally when giving sample.

2. If this is a recurring problem, notify Technician.

D. "Radio Interference".

1. Check to see that no operator is transmitting with their radios.

2. Restart the test

E. If any of the following messages are displayed the instrument will not function. Notify a Technician.

1. Fatal Systems Error.

2. Ram/CRC Error

3. Temperature High or Low

4. Blank Error.

5. Pump Error.

6. Not Calibrated

7. Data Memory Battery Low

VIII. ODDS AND ENDS

A. Have a legible class roster completed for each operator class instructed. Rosters should be sent to the Seattle Breath Test Section, or to the local technician for entry into the training system. The original is then sent to the State Toxicology Lab.

B. Basic Operator and Refresher students must obtain 80% on their exams to pass.

C. Be sure each student conducts an acceptable practical test on the Datamaster.

D. Operator cards are valid for 3 years. There is a 90 day grace period but let operators know that they should not count on a refresher class being available during their grace period, so do not WAIT.

IX. PRACTICAL EXPERIENCE

A. Review lesson plan for Basic Operator training.

B. Review lesson plan for Refresher Operator training.

C. Review all handouts given in a class.

D. Review class exams in detail.

E. Have each student provide practical suggestions on how they have effectively conducted operator classes.

X. WRITTEN EXAMINATION

A. Must obtain 80% on the instructor refresher.

B. If fails to make 80%, a review shall be conducted and the test retaken.